

7 a conductive seal ring extending around the entire periphery of the die in
8 direct contact with the die throughout said elongate region and in direct contact with said
9 gap to provide a limited electrical connection between the ring and the substrate at said
10 gap.

IN THE DRAWINGS:

Submitted herewith are 2 amended drawing sheets on which proposed amendments to Figs. 1 and 2 have been indicated in red ink. It is respectfully submitted that no new matter has been added.

REMARKS

According to the foregoing amendments, claims 1-8 and 14-27 are pending.

The Examiner objected to Figures 1 and 2 stating that these should be labeled as prior art. Accordingly, applicant submits herewith proposed amended figures 1 and 2 for the Examiner's approval with the proposed changes indicated in red. Specifically, applicant is adding the legend "Prior Art" in accordance with the Examiner's wishes. It is respectfully submitted that no new art matter has been added.

Claims 6 and 23 stand rejected under 35 USC §112, first paragraph, as containing subject matter not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it most nearly is connected, to make and/or use the invention. The Examiner contends that there is no support for the claim limitation of a seal ring only electrically contacting the substrate of the semiconductor die at the gap, as recited in claims 6 and 23, because electrical contact is present between the seal and substrate of the semiconductor die at the elongate region. This rejection is respectfully traversed and reconsideration is respectfully requested. It is respectfully submitted that lines 5-14 on page 6 of the specification support claims 6 and 23. Accordingly, it is respectfully requested that the rejection be withdrawn.

Claims 1-4, 6-7, 14-21 and 23-24 stand rejected under 35 USC §103(a) as being unpatentable over Joardar et al. (U.S. Patent No. 5,475,255).

Claims 5, 8, 22 and 25-27 stand rejected under 35 USC §103(a) as being unpatentable over Joardar et al. in view of admitted prior art.

These rejections are respectfully traversed and reconsideration is respectfully requested.

Applicant has amended claim 1 to make it clear that the conductive seal ring is in direct contact with the die throughout the elongate region. Furthermore, claim 1 has been amended to make it clear that the conductive seal ring is in direct contact with the gap of the elongate region. This provides a limited electrical connection between the ring and the substrate at the gap.

In his rejections of claims 1 and 14, the Examiner indicates that although Joardar et al. do not explicitly state that conductor seal ring 107 is in contact with the die at elongate region 106, Figure 2 depicts conductive seal ring 107 is connected to ground voltage 206, which in turn is connected to elongate region 106. Therefore, the Examiner concludes that conductive seal ring 107 is in contact with the die at elongate region 106. It is respectfully submitted, however, that 106 is a “noise isolation ring,” while 107 is a conductive seal ring. These two are adjacent one another as can be clearly seen in Figure 1.

In contrast thereto, and as clearly recited in claims 1 and 14 and illustrated in Figure 3, applicant’s invention provides a conductive seal ring that extends around the entire periphery of the die in direct contact with the die throughout the elongate region. Furthermore, the conductive seal ring is in direct contact with the gap that is defined by the elongate region. Thus, the electrical contact between the substrate and the seal ring is inhibited by the elongate region except at the gap defined by the elongate region. Thus the seal ring does not provide a short circuit to transmit noise. However, the limited electrical contact between the substrate and the seal ring at the gap allows the seal ring to perform its discharge function.

Accordingly, since Joardar et al. do not teach, disclose or even suggest a die seal structure for a semiconductor die or a semiconductor device as recited in claims 1, 14, and 18, it is respectfully submitted that these claims are allowable.

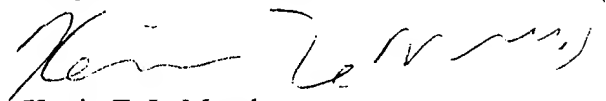
Claims 2-8, 15-17 and 19-27 depend, either directly or indirectly, on claims 1, 14, and 18, respectively, and therefore, they are allowable for the reasons claims 1, 14 and 18 are allowable. These claims further define and augment the features of applicant's invention.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1 1. (Amended) A die seal structure for a semiconductor die having a
2 substrate comprising:
3 an elongate region electrically isolated from the remainder of the substrate
4 extending around a major portion of the periphery of the substrate and having a gap
5 between ends of the elongate region along a minor portion of the periphery; and
6 a conductive seal ring extending around the entire periphery of the die in
7 direct contact with the die [a] throughout said elongate region in direct contact with and
8 said gap to provide a limited electrical connection between the ring and the substrate at
9 said gap.

1 14. (Amended) A die seal structure for a semiconductor die having a
2 substrate of a first conductivity type, comprising:
3 an elongate well region of a second conductivity type opposite from the
4 first conductivity type extending around a major portion of the periphery of the substrate
5 and having a gap between the ends of the elongate region along a minor portion of the
6 periphery; and
7 a conductive seal ring extending around the entire periphery of the die in
8 direct contact with the die [at] throughout said elongate well region and in said gap to
9 provide a limited electrical connection between the ring and the substrate of said first
10 conductivity type at said gap.

1 18. (Amended) A semiconductor device comprising:
2 a. a die including a substrate;
3 b. a die seal structure on the substrate, the structure comprising:
4 an elongate region electrically isolated from the remainder of the
5 substrate extending around a major portion of the periphery of the substrate and having a
6 gap between ends of the elongate region along a minor portion of the periphery; and

7 a conductive seal ring extending around the entire periphery of the die in
8 direct contact with the die [at] throughout said elongate region and in direct contact with
9 said gap to provide a limited electrical connection between the ring and the substrate at
10 said gap.